



# EXPLORING THE EXPERIENCES OF LEARNERS IN SCIENCE CLASSES

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## ABSTRACT

This paper analyzed why students' classroom interaction is not fruitful, how science teaching become interactive, creative, collaborative and inclusive, how home and school environment is in centrality to extend science knowledge. To fulfill my objectives, a secondary level student was purposively selected with the help of the head teacher. About thirty-two minutes in-depth interview was transcribed, coded and four global themes were constructed. On the basis of global themes, the whole data were analyzed according to view of the participant comparing with the literature, shows that the science teaching of selected school is not satisfy. Science teaching is mainly affected by the pedagogical, laboratory and institutional problem. Teachers are also seen as a main problem to implement creativity in science teaching. Functional science curriculum destroyed the critical thinking culture both in students and teachers. This article underestimated the women participation and teachers voices of science teaching.

**KEYWORDS:** Critical pedagogy, Teachers experience, Science teaching, knowledge construction, Participatory learning.

## INTRODUCTION:

In this paper, I explore the experiences of students in science teaching and how our teaching culture is constructed. Science teachers mostly use textbooks and deliver the knowledge that what are written in the textbook. Most of the teachers provide the theoretical knowledge which are written in the text book and delivered the tested theory by writing in blackboard or saying orally. The practical work prescribed in the textbooks and curriculum are rarely conducted. Teachers take only obedient, compliant and dependent children as good students. Those who are independent and curious about teachers teaching and express personal opinions different from teachers are regarded as showing disrespect. This shows that students who are studying in school level are facing many difficulties if they want to be critical. Mostly teachers are not serious about fostering the new knowledge and engaging students in teaching learning situation. Teachers are also in the boundaries of time period. They should complete the allocated syllabus in the given time period which is also impossible to participate students in teaching learning activities.

In this scenario, focusing on the centrality of exploring students voices, this paper analyzes why students classroom interaction is not fruitful, how science teaching become interactive, creative, collaborative and inclusive, how home and school environment is in centrality to extend science knowledge. Our classes are mainly dominated by the teachers. Students are not motivated to learn new ways and our home and school environment is not learners' friendly. All students are not equally involved in classroom learning activities. Mostly students who are creative and active are participated in classroom learning activities. Mostly who are not interested in learning science and not motivated to learn science choose the back seats and they are being inactive due to either uninterested teaching techniques or unrelated syllabus. The nature of science is learning by doing but our science teachers are not encouraging students towards it although the science curriculum has the mandatory to conduct practical activities. There are 50-60 students in a congested classroom and they cannot get the opportunity to interact in the classroom. They have not provided the opportunity to work in groups to solve the problem on the basis of discussion and critical and creative thinking. Most of the students' parents are still illiterate and they have not the knowledge how to encourage their children to learn science and about the nature of science. About the role of home environment for the students learning achievement Schulze and Lemmer (2017) added that differences in children's performance in learning tasks and achievement orientation are shaped by the learning environment of the home.

Like that school administrator has important role to inform learning science in lower understanding parents. Focusing on students learning science Schulze and Lemmer added that "schools should inform parents of their children's science abilities and progress and thus stimulate parental expectancy that their children can indeed succeed in science" (Schulze & Lemmer, 2017, p. 3). But our context is unable to proper manage the classroom and inform the classroom science teaching to the parents and teach with the students' friendly and proper management of laboratory facilities to learn science. The allocated time is insufficient to learn science in participatory and creative way. About the science teaching, Bahng and Lee (2017) added that "the course also emphasizes a practice and reflective approach in order to a) develop a community of active learners, b) learn how to design student-centered and inquiry-based curricula, and c) learn how to

evaluate one's own instructional practices" (p. 227). To address the above issues in my study I am going to use critical, participatory and constructivist theory which are appropriate in the context of science classroom.

In my study critical theory is appropriate because critical theory is concerned with the idea of a just society in which people have political, economic and cultural control of their lives (Bilgili, 2018). Critical theorists believe that systems must be changed to overcome oppression and improve human conditions. Paulo Freire (1921-1997) was a Brazilian whose experiences living in poverty led him to champion education and literacy as the vehicle for social change. In his view, humans must learn to resist oppression and not become its victims, nor oppress others. To do so requires dialog and critical consciousness, the development of awareness to overcome domination and oppression. Rather than "teaching as banking," in which the educator deposits information into students' heads, Freire saw teaching and learning as a process of inquiry in which the child must invent and reinvent the world. Critical theory believes that these goals are satisfied only through emancipating oppressed people which empowers them and enable them to transform their life conditions (Aliakbari & Faraji, 2011). Critical theory tries to transform oppressed people and to save them from being objects of education to subjects of their own autonomy and emancipation. In this view, students should act in a way that enables them to transform their societies which is best achieved through emancipatory education (Bilgili, 2018). Through problem posing education and questioning the problematic issues in learners' lives, students learn to think critically and develop a critical consciousness which help them to improve their life conditions and to take necessary actions to build a more just and equitable society (Aliakbari & Faraji, 2011). Community-based learning and bringing the world into the classroom are strategies of teaching.

So, I use critical theory in my study because this theory is anti-foundationalist, anti-modernist, anti-determinist and process oriented (Bilgili, 2018). Our school system is also guided by the fixed rules and regulations. Classroom structure is fixed, students are provided fixed curriculum and textbooks, and fixed discipline is maintained at the school. In this learning scenario, critical theory is useful to answer how to emancipate the students in classroom activities and how can students are motivated to break down the learning system of the classroom and how they can critique the teaching strategies of teacher. Like that, school system is affected by the political, economic, and cultural system (Bilgili, 2018) which can break only the help of critical theory. So that in my study critical theory is appropriate.

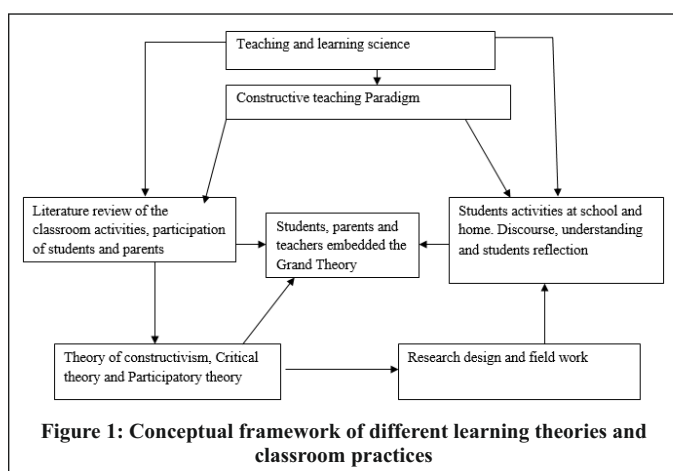
Second theory I choose for my study is Participatory theory. This theory focuses on: Classroom, as the miniature society and different cultural and societal students are gather in the classroom. Their motives towards learning science would not be same and different students who are going to learn in the classroom may have the different capacities and learning ability, in that case the participatory theory of learning may be effective. According to Creswell (2007) "marginalized students are facing the issues of oppression, domination, suppression, elimination and hegemony. As these issues are studies and exposed, the researchers provide a voice for these participants raising their conscientiousness and improving their life" (pp. 21-22). So our teaching learning environment is not so much students friendly and individual learning is neglected. In this scenario participatory theory is helpful to address the individual learning problem and encourages the

students in teaching learning activities.

Third theory I use in my study is Constructivism theory because the main purpose of science teaching is to engage the student in teaching learning activities. Constructivism originates from Bruner's theoretical framework for instruction (Bruner, 1998). The framework is based on the study of cognition. It postulates that learning is an active process in which learners construct new ideas or concepts based upon their past and current knowledge. For this, the students' involvement is importance. According to Ahmad (2009) the function of teachers is only create the environment of learning and maintain the learning materials (p. 178). Students construct new idea on the basic of the past knowledge and experiences. The constructivist instruction provide students the opportunity to interact with other students, interact with the content, learn to understand the viewpoint of others, think critically, test and questions ideas, and form their own points of views (Vygotsky, 1978). According to this theory, each students needs the opportunity to construct his or her own ideas. Students collaborate with more capable and solve their daily live problems (cited in Acharya, 2013). The constructivist theory is based on the interpretive paradigm and which in wholly based on live experience of learners (Creswell, 2007). The issues or problem which are mostly based on the experience of learners towards classroom teaching. So constructivist theory support to my study to engagement and participant of both students and teachers in learning activities. This theory help my study because it focuses on the active involvement of teachers to create learning environment and students to participant in co-operative and collaborative earning.

### Conceptual framework:

Grant and Osanlo (n. d.) has explained about the conceptual mapping of the research; this approach called concept mapping can be used by research teams to help clarify and map out the key research issues in an area to help them operationalize the programs or interventions or the outcome measures for their study. It suggests us that the conceptual framework is skeleton or the main frame of the research study which guides the whole procedures of the study. About conceptual framework Chenail (2011) added that "researcher's understanding of how the research problem will best be explored, the specific direction the research will have to take, and the relationship between the different variable in the study (pp. 16-17). In this research study, teaching practices in Nepalese science classrooms of secondary level students was analyzed. Literature has been reviewed to illustrate the explanation of teaching practices, in term of critical theory, constructivism theory and participatory learning theory. In-depth interview of students was taken to explore the experiences and practices of critical thought in secondary level science classrooms. Additionally, theoretical lenses were used to triangulate data. Critical, participatory and constructivist theory were used for data triangulation. The detail of conceptual framework regarding classroom practices and theoretical lens is given below.



The conceptual map shown above will be applied in my research study. The conceptual map shown above is the theoretical lenses and classroom practices for different theory which may be practices on science classrooms. According to Bahng and Lee (2017) constructive nature of learning and the learning-by-doing approach that emphasizes intrapersonal-interactive collaborative learning, meaningful experiences. So that different theory practice in science classrooms were reviewed already in the theoretical framework section in detail. Purely qualitative research design method was applied; theoretically, Critical theory, participatory and constructivist theory were used. Qualitative data were generated from the field and conclusions were drawn on the basic of theoretical lens.

### METHODS:

Open structure interview has both drawback and benefit in qualitative research. To put focus on the former, there are for instance no standard procedures to follow when conducting interviews. Yet it was decided that face-to-face interviews was the most proper research method in the present study, as the purpose is to explore students experience about science teaching in depth. "Qualitative research interviews give people the opportunity to express their views, expecta-

tions and worries in their own words" (Creswell, 2007). For the purposes of data collection about the experience of secondary level students, I selected a secondary school of Gorkha District in where I was already taught and I was familiar with this school environment. As the purpose of data collection I visited the headmaster and clarify the purposes of my study. I notice him to give the name of secondary level student whose house is outside the school catchment area. The first purpose of selection of outsider student is to explore the feeling of outsider students and to know the learning difficulties of outsider students. Second purpose is he will express the real situation of teaching learning situation of school and home without any hesimony. Then, headmaster recently ordered to called a student whose name is Ram (pseudo name) and briefly stated why he was selected as a sample. Headmaster convinced him to provide all the required information about what he knows. I was also myself assured his that your right of anonymity and privacy would be protected by not disclosing your identity (Khanal, 2017) in my work. Due to time constrains only one student was taken in my study (Creswell, 2007) to accomplish my research objectives.

Ram's house was Argakhachi. He was came with her mother at Gorkha in where he was studied from class eight. As I met Ram, and explain in detail the purpose of data collection, he was became ready to provide all the information about experience of science learning in secondary level and lower level. He was informed to record the interview and he was made confident that his interview record will not be dispose anywhere without his permeation. I requested him to explore the experiences which he had gain about school science teaching, school science teaching environment, laboratory condition, school's cooperation to learn science. He was provided detail information about the condition of science teaching in where he was studying without any hesitation and confidently. After the data collection procedure was completed, the recorded in-depth interview was transcribed first in Nepali language and then transcribed was translated into English language. Then it was coded as a preliminary themes selecting the main words. After coding the transcribe basic themes were declared with collecting nearly related codes. Then from the basic themes, organized themes were declared and from the organized themes, three Global themes were declared. On the basic of Global themes, whole in-depth interview data were analyzed. For the trustworthiness and confidentiality of qualitative data, the transcribed data were shown the participants and validity and reliability of data was confirmed (Creswell, 2007).

### FINDINGS:

#### Pedagogical inefficiency:

According to experience of Ram, pedagogical inefficiency in the science teachers was the main problem of science teaching. Nowadays, teaching is mainly affected by the pedagogical techniques. All trained teachers are not found pedagogically sound in classroom teaching. The science teacher who is teaching science in secondary level was trained and M.Ed. in science education but according to Ram's view, students are not satisfy with his teaching strategies. Ram stated that the science teacher who is teaching in lower secondary level was sound in teaching science. He used to teach by giving the suitable example. According to him, "if it is possible to the administrator, science teacher should be change and effective teachers should be hair". He reported in in-depth interview that teachers would not proper use of black board in the middle of the class and students also not creative and not participative in learning activities. When teachers ask question someone, other students are disturbing to each other. Students are not interested to answer the question. Ram share a experience that: "If students have known the answer they raise their hands and say answer when teacher ask some questions, but if they are unknown about the answer, become inactive and keep silent". This scenario shows that Participatory theory is helpful to arouse the participants in the teaching learning process which focus on the emancipation of learners in teaching learning process. According to Ram, the students achievement in science is not satisfactory. Most of the students are fair listening science subject. I am also fair with chemistry subject because most of the formula of chemistry are not remember easily and teachers cannot clarify the molecular formula of different compounds. He added that: "neither chemical formula are written clearly in book nor teacher write it clearly in the blackboard". We have not the idea to search these materials in Internet also. According to Suchlze and Lemmer (2017) home directed at stimulating science learning, motivate children to choose science as a school subject, encourage children to consider science in their future plans, and promote the choice of science oriented occupations (p. 2) but Ram's home environment was not so science friendly but his mother was serious about his learning at home. She help him to buy the different materials like renounce scientists' biography.

#### Participatory and practical Science teaching:

To explore the experience of students about science teaching, participatory and practical science teaching was seen as a major issue. The nature of science is practical. In secondary level 25% mark and per week one period is prescribed for practical in science curriculum. Without practical, the objectives of science is not fulfilled but our science teaching culture is mostly theory dominance. According to Ram, school science teaching was not satisfactory. Science teacher took the students in the biology lab and ordered to observe the plants and animals which are found there. He didn't inform details about the plants, animals and charts present there. According to Ram, they haven't got the opportunity to observe the Chemistry lab and Physic lab. He added that: "we have not know

about science curriculum and how many practical should we done in the laboratory". Most of the practical are done as a making figure and describing the figure written in the practical copy. Nearly ten to twelve practical are done in practical copy as a practical purpose. On views of Ram for the more knowledge of science, field trip, excursion and science exhibition play crucial role but these are also absent in our school. He clarified about excursion that: "when we read that are forgotten recently but if we see the anything remains in our mind forever". He further added that the nature of course is also vast which make us problem to learn science practically. If we follow the practical based teaching, it is impossible to complete course in time. In the absence of practical lab science teaching can be effective by using locally available materials, which are found in natural environment but the condition of using local materials also not found. The nature is mini laboratory to learn science which provide the real practical knowledge about Natural Science (Ahmad, 2009). According to Ram, the school culture of science teaching is mainly lecture based and somehow discussion. School administration also doing negligence about science laboratory. Science laboratory is crack due to the earth quake 2072 but new science laboratory is not prepared till now.

#### Learning culture:

Learning culture play a curative role to explore the experience of learners about science teaching. According to Khanal (2017) classroom teaching is favoritism towards the dominant student and given extra care and support to brighter students (p. 464) but science teaching was not found so. According to Ram, teachers provide equal opportunity to answer the question and he request to discuss in the classroom although the classroom is not being so. When teacher ask some question then students starts to talk with each other and they don't care about the teacher's questions. The main problems of his class is students inactiveness towards the subject matter. This type of inactiveness in learning is not appropriate for science teaching. Science is that type of subject in which students should get the opportunity "Learning by doing and learning by living" (Ahmad, 2009) but science teacher is unable to do so. Ram was not found so much against the lecture method and said that science course is very vast and difficult to complete course in time. If course is not completed we will be fail in the exam, but he should teach clearly writing the definition of difficult words in the blackboard and explain clearly the subject matter in the classroom may be understand science easily. According to Ram, there is no extra activities related to science. He said, "we have listen about science fair, science exhibition and field trip but neither school administration nor subject teacher provided us such type of opportunity". We haven't get the opportunity to observe zoo and science museum till now. If school take the initiation of such opportunity, we will surely get new knowledge and ideas about science and learn new things observing, analyzing and sharing ourselves from that we construct the knowledge which is helpful for further science learning.

According to Vygotsky (as cited as Khanal, 2017) social culture is also determining factor for learners to get learning opportunity. Mostly family role is important for science choosing and learning. About home environment, Schulze and Lemmer (2017) stated that "towards science, provide educational resources and experiences in the home directed at stimulating science learning, motivate children to choose science as a school subject, encourage children to consider science in their future plans, and promote the choice of science oriented occupations" (p. 2). The literature indicated that the family support is important to support and involve in science learning but Ram's home environment is not so much favor to him. His permanent house was Argakhachi, father is foreign country for job opportunity and his mother is caring both him and his brother for every part of life. She was only literate and have not so much knowledge about what is science, what are the characteristics of science and how to learn science. But according to Ram, she helps to buy new books about life history of scientist and innovative achievement of science. She encourage to do science related practical at home but she did not know what to do, how to do and how to manage the materials. So he realized that both home environment and school environment is important for learning science but schools have the crucial roles to encourage, motivate, and develop creativity toward the students.

#### CONCLUSION:

This article has explored the experiences of learner's about science teaching of teachers and learning situation of our school and home. The literature and experiences of Ram's shows the present context of science teaching. The school teaching scenario shows that without teachers' self motivation towards science teaching it may not change the teaching culture. In the absence of science laboratory and having enough number of students in a class, effective teachers motivate students towards learning environment by providing the opportunity of discussion, interaction and free learning situation.

As discuss earlier, constructivism theory provide students the opportunity to interact with other students, interact with the content, learn to understand the viewpoint of others, think critically, test and questions ideas, and form their own points of views. But according to Ram's view, this was found lacking in science classroom, at school environment and at home also. So as soon as possible student learning opportunity should be provided in the classroom and at home also for the further improvement of science.

As earlier focuses, participatory theory provide the learning opportunity to all

participant by field trip, science exhibition, excursion and participating in demonstration in the classroom but it was not found in our school as mentioned by Ram. Designated science curriculum was found vast and discourage the collaborative field activities to learn science. Students participation was not seen in the present structured science curriculum. As soon as the flexible classroom interaction and participating learning culture developed with slightly changing the structure of present curriculum, students' involvement in science can be drastically change.

As earlier mentioned, critical theory opposes the fixed rules and regulations of schools and society. It focuses on the emancipation of participants and critique the teaching culture which is seen in Ram's opinionative also. He criticized the science teaching of his secondary and lower secondary level science teachers and oppose with secondary level teacher's science teaching and recommended administration to chance the teaching staff if possible. Ram criticized the whole science curriculum, school and home learning environment and suggest new way of science teaching. If the teachers are the main problem of present science teaching either professional development opportunity may be provided or teacher fair and fair system could be implemented.

There are so many limitation also. In this qualitative study only one students was taken as a sample size so that the conclusion of this study cannot generalize as a whole. Another limitation is: this study was carried out only one school of Gorkha district, this type of study is better to carryout in advance area which help the generalization of the result as a whole. Third limitation is: this study was carried out on the boys students but not girl. If similar type of study is carried out in female students, different type of result may be seen. Fourth is: this study is carried out only to explore the viewpoint of student but not science teachers. If science teacher was the participant of the research, another type of result may be seen. Fifth is: I did not established extended relationship with the participants. I interviewed Ram once. Multiple interviews would have been ideal (Creswell, 2007). However I felt that the initial data and my analysis of them provided a strong foundation for more in-depth examination of trust between me and interviewee. Therefore, qualitative research may be affected by so many factors which is impossible to address in my study.

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